

CONTENTS

Publisher's announcement	v
Preface	ix
Conference organization	xi

PECVD 1

Plasma-enhanced CVD of high quality insulating films J. Batey, E. Tierney, J. Stasiak and T.N. Nguyen	1
Influence of helium dilution on physico-chemical and defect properties of PECVD silicon oxynitride films J. Michailos and Y. Cros	16
Oxidation of plasma enhanced chemical vapour deposited silicon nitride and oxynitride films C.M.M. Denisse, H.E. Smulders, F.H.P.M. Habraken and W.F. van der Weg	25

PECVD 2

Formation of thin film dielectrics by remote plasma-enhanced chemical-vapor deposition (remote PECVD) G. Lucovsky, D.V. Tsu, S.S. Kim, R.J. Markunas and G.G. Fountain	33
Assessment of plasma-grown oxides on Si:Ge substrates S. Hall, J.F. Zhang, S. Taylor, W. Eccleston, P. Beahan, G.T. Tatlock, C.J. Gibbings, C. Smith and C. Tuppen	57

OXIDATION

Use of ^{18}O isotopic labelling to study thermal dry oxidation of silicon as a function of temperature and pressure I. Trimaille and S. Rigo	65
Kinetics of dry oxidation of silicon D.R. Wolters and A.T.A. Zegers-van Duynhoven	81
Parallel oxidation model for Si including both molecular and atomic oxygen mechanisms J.M. deLarios, C.R. Helms, D.B. Kao and B.E. Deal	89

OXIDE ANALYTICS

Local atomic structure at thermally grown Si/SiO ₂ interfaces J.T. Fitch, C.H. Bjorkman, G. Lucovsky, F.H. Pollak and X. Yin	103
--	-----

Strain at Si-SiO ₂ interfaces studied by micro-Raman spectroscopy K. Brunner, G. Abstreiter, B.O. Kolbesen and H.W. Meul	116
Vibration spectroscopy for surface layers on Si F. Müller, N. Schwarz, V. Petrova-Koch and F. Koch	127

FILMS ON III-V's

Study of boron nitride gate insulators grown by low temperature plasma enhanced chemical vapor deposition on InP A. Bath, P.J. van der Put, J. Schoonman and B. Lepley	135
A DLTS study of InAs MIS structures (Extended Abstract) E.G. Salman, A.N. Korshunov and V.N. Vertoprakhov	141
Isolation quality in passivated semi-insulating GaAs analyzed by leakage current transients J. Gual, J. Samitier, J.R. Morante, J. Anton, P. Boher and M. Renaud	144
Passivation of InP surfaces controlled by photoluminescence measurements J.Y. Longère, K. Schohe, S.K. Krawczyk, R. Schütz and H.L. Hartnagel	151
Phase composition and structure of native oxides on A ^{III} B ^V semiconductors V.I. Belyi, T.P. Smirnova and N.F. Zakharchuk	161
Passivation of GaInAs pin photodiodes by UVCVD SiN _x Y. Le Bellego, J.C. Renaud, P. Blanconnier and J.P. Praseuth	168

MULTILAYERS AND NITRIDED OXIDES

ONO technology W. Hönllein and H. Reisinger	178
The physics of ONO layer dielectrics A. Spitzer and R. Baunach	192
Simulation of charge transport and trapping in MIS structures with triple-layer dielectrics R. Baunach and A. Spitzer	200
Effects of addition of oxygen and water vapor in high thermal nitridation processes of SiO ₂ thin films B. Balland, J.C. Bureau, A. Benamar, J.J. Dubray and A. Glachant	210
Rapid thermal nitridation of SiO ₂ films J.B. Oude Elferink, F.H.P.M. Habraken, W.F. van der Weg, E. Dooms, M. Heyns and R. De Keersmaecker	219
Characterization of 30 nm nitrided oxides fabricated by rapid thermal nitridation E.E. Dooms, M.M. Heyns and R.F. De Keersmaecker	227
Characteristics of the insulator-semiconductor (IS) systems with a graded-bandgap insulator at high electric fields V.G. Litovchenko, V.G. Popov and A.A. Evtukh	238

IMPURITIES, DOPANTS AT Si-SiO₂

Formation of SiO at Si/SiO ₂ interface and its influence on transport of Group V dopants and Ge in SiO ₂	
G.K. Celler and L.E. Trimble	245
Effects of ion implantation on the interfacial properties of MOS systems	
M. Saettler, V. Lauer, M. Offenberger, K. Heyers and P. Balk	259
Diffusion of cobalt and titanium in SiO ₂	
J. Baten, M. Offenberger, U. Emmerichs, P. Balk, P.J. Grunthaner and S. Ewert	266

INTERFACIAL DEFECTS AND TRAPS

Defect kinetics in hydrogenated amorphous silicon MIS structures	
W.B. Jackson	273
Atomic relaxation of Si-SiO ₂ interface states measured by a photo-depopulation technique	
M.O. Andersson and O. Engström	289
A test of the dangling-orbital versus overcoordination models for the P _b center at the Si-SiO ₂ interface	
N.M. Johnson, Wei Shan and P.Y. Yu	301
A critical assessment of the overcoordination model for the P _b center at the <111> Si/SiO ₂ interface	
A.H. Edwards	309
Electron spin resonance observation of the interfacial *Si=Si ₃ (P _{bo}) defect in thermally grown (111)Si/Si ₃ N ₄	
A. Stesmans and G. Van Gorp	317

MORE INTERFACIAL DEFECTS AND TRAPS

Oxide field dependence of Si-SiO ₂ interface state generation and charge trapping during electron injection	
M.M. Heyns, D. Krishna Rao and R.F. De Keersmaecker	327
Modification of the Si-SiO ₂ interface by the degradation-annealing cycle	
Q.-Y. Ye and F. Koch	339
Influence of annealing on interfaces of MOS structures with RTO oxides	
S. Prasad and R. Ferretti	348
Effect of Cs contamination on the interface state density of MNOS capacitors	
W. Bauch, K. Jäger and R. Hezel	356
Mobile ion instabilities in polycrystalline silicon thin film transistors	
N.D. Young and A. Gill	364
The application of vanadium-doped SiO ₂ to EEPROM devices	
A.J. Snell, J.J. Delima, K.V. Krishna and A.E. Owen	368
Interface state behaviour of plasma grown oxides following low temperature annealing	
J.F. Zhang, P. Watkinson, S. Taylor and W. Eccleston	374

Investigation of MIS structures using avalanche multiplication S.V. Bogdanov, P.P. Povarov, V.E. Shubin and D.A. Shushakov	381
Transformation of Si-SiO ₂ -Al structures under RF-plasma treatment (Extended Abstract) V.S. Lysenko, A.N. Nazarov, I.N. Osiyuk and V.I. Turchanikov	388

TRAPS IN SiO₂ AND Si₃N₄

The nature of the dominant deep trap in amorphous silicon nitride films: evidence for a negative correlation energy P.M. Lenahan, D.T. Krick and J. Kanicki	392
Fundamental differences in the nature of electrically active point-defects in plasma enhanced chemical vapor deposited and thermal oxide structures W.L. Warren, P.M. Lenahan and B. Robinson	406
Electron spin resonance study of metal-nitride-silicon structures: observation of Si dangling bonds with different configurations and trapping properties in silicon nitride D. Jousse, J. Kanicki and J.H. Stathis	412
Coulombic and neutral electron trapping centers in SiO ₂ D.A. Buchanan, M.V. Fischetti and D.J. DiMaria	420
Spatial distribution of damage caused by 6.4 eV photon irradiation in the gate oxide of MOSFET's M. Brox, F. Hofmann and W. Weber	429

ROUGHNESS

Correlation of surface morphology and chemical state of Si surfaces to electrical properties P.O. Hahn, M. Grundner, A. Schnegg and H. Jacob	436
Continuous roughness characterization from atomic to micron distances: angle-resolved electron and photon scattering G.J. Pietsch, M. Henzler and P.O. Hahn	457
The changes in Si surface roughness and their diagnostics I.A. Aizenberg, I.R. Moskvina and S.N. Nosenko	473

NOISE

The gate-voltage dependence of telegraph noise amplitudes in small MOSFET's M.J. Uren and M.J. Kirton	479
Statistics of random telegraph signals in MOSFET's O. Jäntschi	486
Temperature dependence of low-frequency noise in n-channel MOS transistors H. Wong and Y.C. Cheng	493
Characterization of individual defects in MOSFET's A. Karmann and M. Schulz	500

HOT-CARRIER DEGRADATION IN Si MOSFET's

Introduction to Satellite Workshop on the Physics of Hot-Carrier Degradation in Si MOSFET's	510
The effect of hydrogen on hot carrier and radiation immunity of MOS devices Y. Nissan-Cohen	511
Understanding of the hot carrier degradation behaviour of MOSFET's by means of the charge pumping technique H.E. Maes, G. Groeseneken, P. Heremans and R. Bellens	523
A cross section of hot-carrier phenomena in MOS ULSI's E. Takeda	535
Interface states generated by the injection of electrons and holes into SiO ₂ S.A. Lyon	552
Trapping of hot electrons D.R. Wolters and A.T.A. Zegers-van Duynhoven	565
The physics of hot-electron degradation of Si MOSFET's: can we understand it? M.V. Fischetti, S.E. Laux and D.J. DiMaria	578
Author index	597
Subject index	603



